

Acute sinusitis

Graham Worrall MBBS MSc FCFP

Because children have very small, underdeveloped sinuses, acute sinusitis in children is rarely seen in general practice. This article considers the common type of sinusitis seen in adults.

One Tuesday morning Fred Brown, a 35-year-old accountant, comes to see you. He complains of 2 days of pain in both cheeks and his forehead; he has a runny nose and a slightly sore throat, and he is having a hard time concentrating at work. He does not have a fever or a cough.

His medical record shows that, apart from a broken arm when he fell off his bike at 15 and acute appendicitis when aged 23, he has had no serious illness. He is not taking any long-term medication. He has come to your office 3 times in the past 5 years: for influenza, for a head cold, and for sinusitis, receiving antibiotics from a colleague of yours for the sinusitis.

He is married with 2 young children.

Epidemiology and population at risk

Approximately 0.5% of all upper respiratory tract infections are complicated by sinusitis; the incidence of acute sinusitis ranges from 15 to 40 episodes per 1000 patients per year, depending on the setting.^{1,2} It is much more common in adults than it is in children, whose sinuses are not fully developed.³ Acute sinusitis is the second most common infectious disease seen by GPs.^{4,5} Most acute sinusitis is caused by the same viruses that cause the common cold.⁶ Although up to one-third of adult patients seen in ears, nose, and throat clinics might have acute bacterial sinusitis (and cultures of antral puncture specimens show *Streptococcus pneumoniae* and *Haemophilus influenzae* to be the most common causative bacteria), the proportion of cases of acute sinusitis due to bacteria is much smaller in primary care—probably less than 2%.⁷

It has been found that 75% or more of patients with sinusitis in the placebo groups of antibiotic trials get better spontaneously within 7 to 10 days.⁸ Complications from acute bacterial sinusitis are very rare; none occurred in the placebo arms of the primary care antibiotic trials.

As Mr Brown has a runny nose and has only experienced facial pain for 2 days, it is likely his symptoms are due to the common cold. His job entails meeting a lot of other people, and he probably picked up an infection from one of them.

What else could it be?

Other causes of facial pain (which need to be excluded) include the following:

- toothache,
- tooth or gum infections,
- temporomandibular (TM) joint pain,
- tic douloureux (trigeminal neuralgia),
- facial herpes simplex, and
- facial herpes zoster.

Mr Brown says that he gets regular dental checkups, and he believes his teeth and gums to be healthy. The pain is not worse when he is chewing or biting. He has not noticed any pain in his ears, and he can move his face normally. His nose is runny, and his nostrils are partly blocked. He has not noticed a rash; he cannot remember having chickenpox; and he is not prone to cold sores.

Before examining Mr Brown, you consider what other more serious illnesses it could be.

Alarm symptoms. Mr Brown reports no fever (more characteristic of acute bacterial infection), and he does not feel particularly ill (degree of illness and slowness of recovery have been found to be associated with more severe illness). There has been no rash on his face (as in herpes simplex or zoster), and there is no pain when he moves his face (as in tic douloureux or TM joint dysfunction).

Alarm signs. There might be pus seen in the ostia or the cavity of the nose (suggesting bacterial infection). There might be a high fever. The patient might be constitutionally ill (characteristic of acute bacterial infections or of spread of disease from the sinusitis). Spread of sinusitis to the central nervous system will produce lethargy or neurologic signs. Herpes simplex and zoster produce characteristic rashes.

Mr Brown has no alarm symptoms. You proceed to examine him. His temperature is 36.8°C; his pulse is 72 beats/min. He has a runny nose, but you do not see any purulent discharge in either nostril or in his pharynx. Palpation reveals slight tenderness over his left maxilla, but his ears, teeth, gums, and TM joints are normal. He has no trouble breathing; findings from his chest examination are normal. He is alert and orientated. He has no rash, no swollen glands, and no alarm signs.

You are becoming more certain that he probably has acute viral sinusitis complicating a common cold.

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How sure of the diagnosis are you?

Acute sinusitis is a classic primary care diagnosis, usually made based on history and examination alone. This is because investigations, whether simple (transillumination, plain sinus x-ray scans, or culture of nasal discharge) or more complex (ultrasonography or computed tomography [CT] scans), have been found to be of no diagnostic value in the primary care population with sinusitis.⁸⁻¹¹

Many attempts have been made to identify a constellation of signs and symptoms that will increase the likelihood of bacterial sinus infection being present.¹²⁻¹⁵ The most important signs, symptoms, and test results, as well as their likelihood ratios (LRs) for presence or absence of bacterial sinusitis, are shown in **Table 1**.¹⁴

Table 1. Likelihood ratios for the presence or absence of bacterial sinusitis

SIGNS, SYMPTOMS, AND TEST RESULTS	POSITIVE LIKELIHOOD RATIO	NEGATIVE LIKELIHOOD RATIO
Symptoms		
• Purulent rhinorrhea	1.5	0.26
• Unilateral face pain	1.8	1.3
• Pain in teeth	2.5	0.66
• 2-phase illness	2.1	0.43
• No relief from decongestants	2.1	0.7
Signs		
• Purulent nasal secretion	5.5	0.45
• Pain on stooping	1.6	0.33
• Transillumination	1.6	NA
• Tender maxillary sinus	0.75	1.54
Blood test results		
• ESR > 10 mm/h	2.9	0.70
• CRP level > 10 mg/L	1.8	0.45

CRP—C-reactive protein, ESR—erythrocyte sedimentation rate, NA—not applicable.

Data from Lindbaek and Hjortdahl.¹⁴

It is striking that all the LRs, both positive and negative, are low. The only one that approaches a value that would substantially change a physician's estimate of the likelihood of disease is the positive LR for the presence of purulent nasal secretion.

Because of the low LRs associated with these symptoms, signs, and test results, there is currently no evidence-based decision rule that is useful for the diagnosis of acute sinusitis in primary care. The diagnosis is usually clinical; cultures from the nasopharynx do not reflect the organisms causing sinusitis.^{6,16} Transillumination of the sinuses has low sensitivity.⁷ Ultrasonography has also proven to be of little value for diagnosing sinusitis in primary care populations.^{9,17} Although CT scans have been recommended by some experts, 40% of people who have CT scans for

nonsinusitis symptoms show mucosal abnormalities,¹⁸ and 87% of people with uncomplicated common colds also show sinus abnormalities on CT scan.¹¹

The absence of purulent nasal discharge, fever, prolonged illness, and severe illness, plus only a moderate degree of sinus tenderness, all make it likely that Mr Brown is suffering from a common cold with sinus congestion.

You inform him that he likely has viral sinusitis and that it is a self-limiting disease for which antibiotics will not provide any benefit.

Is it likely to get worse?

In otherwise healthy people, viral sinusitis is usually self-limiting and rarely produces serious after-effects. Most patients will get better without treatment in 7 to 10 days. In the control groups in the trials of antibiotics for sinusitis, 90% of untreated patients were completely better by the end of 1 week, about the same as the proportion of those treated with antibiotics.¹² When symptoms persist beyond 7 days, and when the patient experiences a "second sickening," the possibility of bacterial sinusitis increases, but serious complications from bacterial sinusitis are very rare.

Deciding on the best treatment

In Europe and North America, more than 90% of patients with diagnoses of "acute sinusitis" in primary care receive prescriptions for antibiotics.⁸ This occurs despite the self-limiting natural history of untreated sinus infections and the results of the many antibiotic trials, which show that most patients in the placebo groups get better almost as quickly as those who receive antibiotic treatment. Many patients (like Mr Brown on a previous visit) have received antibiotics before and have an expectation that they should receive them when they have sinusitis again.

There have been relatively few trials of antibiotics for adults with acute sinusitis in the primary care setting; in general, those that have been done show that although antibiotics clear up the colour of the purulent mucus, they have little effect on the duration or severity of the illness. The best systematic review¹² found that the beneficial effects, if any, were so small that the number needed to treat for 1 patient to benefit slightly was about 16 patients, a number greater than that needed to produce an antibiotic side effect (approximately 10). Unfortunately, one study has clearly shown that no combination of symptoms and signs can predict which patients are likely to have more prolonged illness or if a particular patient is one of the small minority who might benefit from antibiotic treatment.¹⁹ Another review suggests that if an antibiotic is used the best one in primary care is probably a cheap broad-spectrum one such as amoxicillin,⁹ and that a 5-day course is probably as effective as a 10-day course.²⁰

Because of the disappointing response to antibiotics, perhaps it is better to concentrate on relieving the

patient's symptoms. Textbooks suggest comfort measures for patients with symptoms of acute sinusitis: maintenance of adequate hydration (to loosen secretions), application of warm facial packs (to help promote drainage of mucus), administration of analgesics (for the localized pain and tenderness), use of decongestants (to increase ostial diameter and promote sinus drainage), and use of saline nose drops (to provide moisture and improve mucociliary function). Unfortunately, no good-quality trials have been done to show that any of these measures are effective.

A review suggested that intranasal steroid sprays might be modestly effective for relieving symptoms of acute sinusitis.²¹ A South African study relieved symptoms with 1-mg betamethasone tablets daily for 5 days.²² Unfortunately, these treatments were used concurrently with antibiotics, which made their effects (if any) difficult to quantify. One review found that evidence for the benefit of herbal medicines (whether occidental or oriental) was very limited.²³

A study in the Netherlands found that if a wait-and-see approach were used, 91% of patients complaining of acute sinus symptoms would get better within 1 week.²⁴ There are no studies to show that intervening in the acute illness has any beneficial effect in preventing chronic sinusitis or the rare acute complications of sinusitis.

You explain to Mr Brown that his sinus symptoms are most likely due to viral infection, and that he is unlikely to benefit from antibiotic treatment. His illness will likely last 7 to 10 days, and there should not be any complications. He accepts this, but asks you if there are any medicines other than painkillers or decongestants he can take; in past experience he has found both of these make him drowsy and interfere with his concentration at work.

You explain that there really is not enough evidence to convince you that either steroids or herbal medicines have much effect on the symptoms. Unfortunately, there really is no good treatment for the condition. If he wants a steroid nasal spray, you are willing to prescribe one.

Is it safe to wait and see?

In the antibiotic trials, patients in the placebo-control groups were no more ill than those receiving treatment.

Mr Brown is a healthy man, and it is likely that the worst of his infection is over; he will probably be better in a few days. There is no harm in taking analgesics, decongestants, or steroids for a short while.

As there are no signs of complications, you suggest that things will improve spontaneously, but he should come back to see you if the condition worsens or does not improve in a few days, or if he develops a fever. Mr Brown mentions that he is due to leave town in 3 days for a business meeting. He is worried that he might get worse while he is away in a strange city. Could he have an antibiotic prescription to take, just in case he gets worse?

A Cochrane systematic review²⁵ found that, for acute upper respiratory tract infections, use of delayed prescriptions did not result in patient harm and it reduced antibiotic use. One of the trials reviewed was for acute sinusitis; delaying the antibiotic prescription made no difference to outcomes.

You give Mr Brown a prescription for a 5-day course of amoxicillin-clavulanate, which he should consider taking if his symptoms do not improve within a few days. 🌿

Dr Worrall is Honorary Research Professor in the Department of Family Medicine at Memorial University of Newfoundland in St John's.

Competing interests
None declared

Correspondence
Dr Graham Worrall, Dr W.H. Newhook Memorial Clinic, Family Medicine, Box 449, Whitbourne, NF A0B 3K0; e-mail gworrall@mun.ca

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